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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/765,668

01/27/2004

David B. Rozema

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EXAMINER

DUNSTON, JENNIFER ANN

ART UNIT

PAPER NUMBER

1636

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/765,668

Applicant(s)

ROZEMA ET AL.

Examiner

Jennifer Dunston

Art Unit

1636

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5,7,8,12-14,16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5,7,8,12-14,16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/5/2006 has been entered.

Receipt is acknowledged of an amendment, filed 12/5/2006, in which claims 1-4, 6, 9-11, 15 and 18-20 were canceled; and claims 5, 7 and 12 were amended. Currently, claims 5, 7, 8, 12-14, 16 and 17 are pending and under consideration.

Any rejection of record in the previous office actions not addressed herein is withdrawn.

Claim Objections

Claim 5 is objected to because of the following informalities: at line 6, the comma after the word "and" should be deleted to improve the grammar of the claim. Appropriate correction is required. This is a new objection.

Claim 12 is objected to because of the following informalities: at line 6, the comma after the word "and" should be deleted to improve the grammar of the claim. Appropriate correction is required. This is a new objection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 7, 8, 12-14, 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This is a new rejection.

The term "styrene-maleic anhydride-based random copolymer" in claim 5 renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "styrene-maleic anhydride based" is unclear in that one of ordinary skill in the art would not know how much one could vary the structure of the styrene and maleic anhydride in terms of chemical substitutions, for example, and meet the limitations of the claimed invention.

Claims 7 and 8 depend from claim 5 and thus are indefinite for the same reasons as applied to claim 5.

The term "vinyl ether-maleic anhydride-based alternating copolymer" in claim 12 renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "vinyl ether-maleic anhydride based" is unclear in that one of ordinary skill in the art would not know how much one could vary the structure of the vinyl ether and maleic anhydride in terms of chemical substitutions, for example, and meet the limitations of the claimed invention.

Claims 13, 14, 16 and 17 depend from claim 12 and thus are indefinite for the same reasons as applied to claim 12.

Response to Arguments - 35 USC § 112

The previous rejection of claims 7 and 8 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicant's amendment to the claims in the reply filed 12/5/2006.

The previous rejection of claims 5, 12-14, 16 and 17 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of Applicant's amendment to the claims in the reply filed 12/5/2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 12, 13, 16 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Rozema et al (US Patent Application Publication No. 2002/0052335, cited in a prior action; see the entire reference). This rejection was made in the Office action mailed 9/18/2006 and is reiterated below.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C.

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102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 12, Rozema et al teach a method for delivering a nucleic acid to a cell, comprising the steps of (i) forming poly(methylvinylether maleic anhydride), pMVMA, (ii) reacting the pMVMA with an amine-containing compound, such as histamine to form pMVMA with hydrophobic imadazole groups linked to the anhydride monomers in the copolymer, Mirus Corporation number 510 (MC510), (iii) mixing MC510, a polycation and a nucleic acid, and (iv) contacting a cell or organism with the MC510/nucleic acid complex (e.g. paragraphs [0035], [0087] and [0122]-[0129]).

Regarding claim 13, the methyl vinyl ether of the MC510 compound is an alkyl vinyl ether (e.g. paragraph [0123]).

Regarding claim 16, the reaction of the histamine will form a hydrophobic ester group (e.g. paragraphs [0122]-[0126]).

Regarding claim 17, the histamine linked to the anhydride monomer of the polymer is a functional group (e.g. paragraphs [0122]-[0128]). Furthermore, Rozema et al teach the introduction of functional groups, such as targeting groups, to the polymer monomers before or after polymerization (e.g. paragraph [0058]).

Claims 12, 13, 16 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Trubetskoy et al (US Patent No. 6,740,336, cited in a prior action; see the entire reference), as

evidenced by Rozema et al (US Patent Application Publication No. 2002/0052335, cited in a prior action). This rejection was made in the Office action mailed 9/18/2006 and is reiterated below.

Trubetskoy et al teach a method of introducing a nucleic acid into a cell, comprising the steps of (i) forming a complex by mixing DNA with 1PEI and adding MC510 to the binary complex, and (ii) adding the complex to cells cultured *in vitro* (e.g. column 12, lines 35-56). Rozema et al is cited only to show that MC510 is made by forming poly(methylvinylether maleic anhydride), pMVMA and reacting the pMVMA with histamine to form pMVMA with hydrophobic imadazole groups linked to the anhydride monomers in the copolymer, Mirus Corporation number 510 (MC510) (e.g. paragraphs [0035] and [0122]-[0129]). The methylvinylether is alkyl vinyl ether, and the histamine linked to the maleic anhydride monomers forms a hydrophobic ester, which is a functional group.

Claims 12, 13 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomlinson et al (US Patent No. 6,211,250 B1; see the entire reference), as evidenced by Yu et al (The Journal of Investigative Dermatology, Vol. 112, No. 3, pages 370-375, 1999). This is a new rejection.

Regarding claim 12, Tomlinson et al teach a method comprising the steps of (i) forming a composition comprising a rate modulating polymer, a volatile solvent, and at least one physiologically active agent, and (ii) applying the composition to the skin of a subject to form a thin film on the skin surface (e.g. column 2, lines 35-62). Tomlinson teach the use of polyvinylmethylether maleic anhydride (PVM-MA) butylester as the rate modulating polymer

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and nucleic acids (e.g. DNA) as the physiologically active agent (e.g., column 5, lines 41-54; column 6, lines 24-31; column 8, line 20).

Yu et al is cited only to provide evidence that once the skin is contacted with the composition, the cells of the superficial epidermis will endocytose the compounds applied to the skin (e.g. 372, Sites of gene expression; Figure 3).

Regarding claim 13, the polyvinylmethylether maleic anhydride (PVM-MA) butylester of Tomlinson et al is an alkyl vinyl ether (e.g. column 5, lines 41-54).

Regarding claim 16, the polyvinylmethylether maleic anhydride (PVM-MA) butylester of Tomlinson et al is a hydrophobic ester of polyvinylmethylether maleic anhydride (e.g. column 5, lines 41-54).

Claims 5, 7, 8, 12, 13, 16, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Adams et al (US Patent Application Publication No. 2005/0153926 A1; see the entire reference). This is a new rejection.

Adams et al teach a method of delivery a polynucleotide to the cytoplasm of a cell, comprising (i) forming a composition comprising a water soluble polymer such as styrene-maleic anhydride, divinylether-maleic acid or poly(maleic anhydride-co-vinyl ether) and a nucleic acid linked to the polymer via an ethylene group (a functional group), where the polymer, wherein the polymer is further modified by the addition of esters, and (ii) administering the composition to a cell *in vitro* such that the cell endocytoses the polymer and nucleic acid (e.g. paragraphs [0037], [0081]-[0084], [0090]-[0093], [0162] and [0171]).

Response to Amendment

The declaration under 37 CFR 1.132 filed 12/5/2006 is insufficient to overcome the rejection of claims 12, 13, 16 and 17 based upon the Rozema et al (US Patent Application Publication No. 2002/0052335) reference or the Trubetskoy et al (US Patent No. 6,740,336) reference applied under 35 USC 102(e) as set forth in the last Office action.

The declaration states that U.S. Application No. 10/765,668, U.S. Patent Application Publication No. 2002/0052335, and US Patent No. 6,740,336 were commonly owned or subject to an obligation of assignment to Mirus Bio Corp. at the time the invention of the 10/765,668 application was made.

To overcome a rejection under 102(e) where the reference has a common inventor and/or assignee, Applicants must provide a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131. See MPEP §§ 715.01(b) and 2136.05.

Response to Arguments - 35 USC § 102

With respect to the rejection of claims 12, 13, 16 and 17 under 35 U.S.C. 102(e) as being anticipated by Rozema et al (US Patent Application Publication No. 2002/0052335), Applicant's arguments filed 12/5/2006 have been fully considered but they are not persuasive. The response asserts that US Patent Application Publication No. 2002/0052335 is not by "another." This is not found persuasive, because the declaration shows that the instant application and the 2002/0052335 publication were commonly owned at the time the invention was made. The mere

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fact that the reference patent or application publication which shows but does not claim certain subject matter and the application which claims it are owned by the same assignee does not avoid the necessity of filing an affidavit or declaration under 37 CFR 1.131, in the absence of a showing under 37 CFR 1.132 that the patentee derived the subject matter relied on from the applicant (MPEP § 716.10). The common assignee does not obtain any rights in this regard by virtue of common ownership which he or she would not have in the absence of common ownership. *In re Frilette*, 412 F.2d 269, 162 USPQ 163 (CCPA 1969); *Pierce v. Watson*, 275 F.2d 890, 124 USPQ 356 (D.C. Cir. 1960); *In re Beck*, 155 F.2d 398, 69 USPQ 520 (CCPA 1946). See MPEP § 715.01(b).

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

With respect to the rejection of claims 12, 13, 16 and 17 under 35 U.S.C. 102(e) as being anticipated by Trubetskoy et al (US Patent No. 6,740,336), Applicant's arguments filed 12/5/2006 have been fully considered but they are not persuasive. The response asserts that US Patent No. 6,740,336 is not by "another." This is not found persuasive, because the declaration shows that the instant application and the 6,740,336 patent were commonly owned at the time the invention was made. The mere fact that the reference patent or application publication which shows but does not claim certain subject matter and the application which claims it are owned by the same assignee does not avoid the necessity of filing an affidavit or declaration under 37 CFR 1.131, in the absence of a showing under 37 CFR 1.132 that the patentee derived the subject matter relied on from the applicant (MPEP § 716.10). The common assignee does not obtain any

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rights in this regard by virtue of common ownership which he or she would not have in the absence of common ownership. *In re Frilette*, 412 F.2d 269, 162 USPQ 163 (CCPA 1969); *Pierce v. Watson*, 275 F.2d 890, 124 USPQ 356 (D.C. Cir. 1960); *In re Beck*, 155 F.2d 398, 69 USPQ 520 (CCPA 1946). See MPEP § 715.01(b).

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 7, 8, 12-14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonge et al (US Patent No. 6,436,905, cited in a prior action; see the entire reference) in view of Maeda et al (US Patent No. 4,732,933, cited in a prior action; see the entire reference). This ground of rejection was made in the Office action mailed 9/18/2006 and has been extended to address claim 7 and 8, which were amended in the reply filed 12/5/2006.

Tonge et al teach a composition comprising a synthetic amphipathic polymer, including both hydrophobic groups and anionic hydrophilic groups and acting as a lipid-solubilizing agent (e.g. column 3, lines 49-52). Tonge et al teach that especially suitable polymers may be formed as alternating copolymers of maleic acid (or the anhydride thereof) with styrene, indene or a C₁₋₄ alkyl, e.g. methyl substituted styrene or indene, or with propyl (or isopropyl) or butyl vinyl ether

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(e.g. column 6, lines 27-31, 60-63). Tonge et al disclose examples of suitable polymers, including Poly(maleic anhydride-styrene) (a random copolymer), Poly(maleic anhydride-propyl vinyl ether), and Poly(maleic anhydride-butyl vinyl ether) (e.g. column 6, lines 60-63). Tonge et al teach the use of the polymers to administer drugs or DNA or RNA to cells to facilitate the uptake of the therapeutic agent into target cells (e.g. column 1, lines 31-45; column 12, line 40 to column 13, line 10).

Tonge et al do not teach covalently linking hydrophobic groups to anhydride monomers in the copolymer. Tonge et al do not teach the formation of hydrophobic esters of the alkyl vinyl ether maleic anhydride copolymers or styrene maleic anhydride copolymers.

Maeda et al teach half-esterified styrene-maleic anhydride copolymers (SMA) for the delivery of the antitumor drug neocarzinostatin (NCS) to cells (e.g. column 4, lines 4-10; column 3, lines 25-47). Maeda et al teach the reaction of the maleic acid units to form hydrophobic esters of a monohydric alcohol or a monohydroxyalkyl ether of a di- or trihydric alcohol (e.g. column 1, lines 20-46). One embodiment disclosed by Maeda et al is neocarzinostatin-half butyl-esterified styrene-maleic acid copolymer complex (SMANX) (e.g. Example 1). Maeda et al teach the administration of the copolymer complex to tumor cells *in vivo* (e.g. paragraph bridging columns 6-7; column 3, lines 55-65). The compound is capable of entering the cell as evidenced by the effect of SMACS complex *in vivo* on the surviving percentage of mice with tumor cells implanted in the abdominal cavity (e.g. column 11, lines 58-68; column 12, lines 28-33; Table 6). Maeda et al teach that the addition of the half-esterified residues provides the advantage of providing lipid solubility while maintaining water solubility, which allows the

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composition to be administered as a water soluble composition (e.g. column 3, line 66 to column 4, line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the maleic anhydride copolymers of Tonge et al to include the hydrophobic esters of Maeda et al because Tonge et al and Maeda et al teach it is within the ordinary skill in the art to use maleic anhydride-based copolymers for the delivery of macromolecules to cells.

One would have been motivated to make such a modification in order to receive the expected benefit of being able to deliver the complex as a water soluble composition while maintaining the lipid solubility of the maleic anhydride-based copolymer as taught by Maeda et al. Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent any evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al (US Patent Application Publication No. 2005/0153926 A1; see the entire reference) in view of Tonge et al (US Patent No. 6,436,905, cited in a prior action; see the entire reference). This is a new rejection.

The teachings of Adams et al are described above and applied as before.

Adams et al do not specifically teach poly(maleic anhydride-co-vinyl ether) where the vinyl ether is propyl vinyl ether or butyl vinyl ether.

Tonge et al teach a composition comprising a synthetic amphipathic polymer, including both hydrophobic groups and anionic hydrophilic groups and acting as a lipid-solubilizing agent

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(e.g. column 3, lines 49-52). Tonge et al teach that especially suitable polymers may be formed as alternating copolymers of maleic acid (or the anhydride thereof) with styrene, indene or a C₁₋₄ alkyl, e.g. methyl substituted styrene or indene, or with propyl (or isopropyl) or butyl vinyl ether (e.g. column 6, lines 27-31, 60-63). Tonge et al disclose examples of suitable polymers, including Poly(maleic anhydride-styrene) (a random copolymer), Poly(maleic anhydride-propyl vinyl ether), and Poly(maleic anhydride-butyl vinyl ether) (e.g. column 6, lines 60-63). Tonge et al teach the use of the polymers to administer drugs or DNA or RNA to cells to facilitate the uptake of the therapeutic agent into target cells (e.g. column 1, lines 31-45; column 12, line 40 to column 13, line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of delivering a nucleic acid to a cell using a poly(maleic anhydride-co-vinyl ether)-based composition to include propyl vinyl ether or butyl vinyl ether as the vinyl ether, which is taught by Tonge et al, because Adams et al and Tonge et al teach it is within the ordinary skill in the art to use poly(maleic anhydride-co-vinyl ether)-based compositions for the delivery of nucleic acid to a cell.

One would have been motivated to make such a modification in order to receive the expected benefit of defining the complete structure of the poly(maleic anhydride-co-vinyl ether) with a vinyl ether suitable for the delivery of nucleic acid as taught by Tonge et al. Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent any evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

Response to Arguments - 35 USC § 103

With respect to the rejection of claims 5, 7, 8, 12-14, 16 and 17 under 35 U.S.C. 103(a) as being unpatentable over Tonge et al in view of Maeda et al, Applicant's arguments filed 12/5/2006 have been fully considered but they are not persuasive.

The response asserts that the claims have been amended to recite a process “consisting essentially of...”, and Tonge et al teach only a lipid-containing composition and not a polynucleotide-polymer composition without lipid.

The transitional phrase “consisting essentially of” limits the scope of a claim to the specified materials or steps “and those that do not materially affect the basic and novel characteristic(s)” of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, “consisting essentially of” will be construed as equivalent to “comprising.” See, e.g., *PPG*, 156 F.3d at 1355, 48 USPQ2d at 1355. In the instant case, Applicant has not provided evidence that the presence of the lipid of Tonge et al materially changes the characteristics of Applicant’s invention. Tonge et al teach the use of the composition comprising the polymer and lipid for the delivery of a polynucleotide to the cytoplasm of the cell. Applicant has the burden of showing that the additional steps or components would materially change the Applicant’s invention.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

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Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Dunston whose telephone number is 571-272-2916. The examiner can normally be reached on M-F, 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Remy Yucel can be reached on 571-272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer Dunston, Ph.D.
Examiner
Art Unit 1636

jad

CELINE QIAN, PH.D.
PRIMARY EXAMINER

